Answer on Question #70730 – Math – Trigonometry

Question

Top is 12 meters across: straight line down is 7.81 meters, slope is 2:1. What is the base?

Solution

AB = 12

AD = 7.81

Angles ∠BAD and ∠ADC are equal to 90° (we assume the minimum distance is between AB and DC so the angle ∠ADC = 90° , and ABCD is a trapezium then the angle ∠DAB =90°, or else we can't find the base). BH is a height of the trapezium; ABHD is a rectangle, so AB = HD , AD = BH.

The slope is 2:1 so tan(∠BCH)=1/2 (or tan(∠BCH) =2, that depends on what you mean when you say that the slope is 2:1).

If tan(∠BCD)=1/2 then tan(∠BCD)=tan(∠BCH)=BH/CH=1/2, so CH=2×BH = 2 ×7.81=15.62 (meters).

The base is DC = DH + CH = 12 + 15.62 = 27.62 (meters).

If tan(∠BCD)=2 then tan(∠BCD)=tan(∠BCH)=BH/CH=2, so CH=BH/2 =7.81 : 2=3.905 (meters).

The base is DC = DH+CH = 12 + 3.905 = 15.905 (meters).

Answer: 27.62 meters or 15.905 meters.